Science of Nutrition

CREDIT HOURS
3

LEVEL
LOWER

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Before You Choose This UExcel Exam

Uses for the Examination

- Excelsior College, the test developer, recommends granting three (3) semester hours of lower-level undergraduate credit to students who receive a letter grade of C or higher on this examination.

- Other colleges and universities also recognize this exam as a basis for granting credit or advanced standing.

- Individual institutions set their own policies for the amount of credit awarded and the minimum acceptable score.

Exam-takers who have applied to Excelsior College should ask their academic advisor where this exam fits within their degree program.

Exam-takers not enrolled in an Excelsior College degree program should check with the institution from which they wish to receive credit or advanced standing to determine whether credit will be granted and/or to find out the minimum grade required for credit. Those who intend to enroll at Excelsior College should ask an admissions counselor where this exam fits within their intended degree program.

For more information on exam availability and actual testing information, see the Exam Registration and Information Guide.

Examination Length and Scoring

This examination consists of 120 multiple choice and other type questions. You will have two (2) hours to complete the exam. Your score will be reported as a letter grade. Questions are scored either correct (1) or incorrect (0). There is no partial credit. Each credit-bearing exam contains pretest questions, which are embedded throughout the exam. They are indistinguishable from the scored questions. It is to your advantage to do your best on all the questions. Pretest questions are being tried out for use in future versions of the exam.

The UExcel exams do not have a fixed grading scale such as A = 90–100%, B = 80–90%, and so forth, as you might have seen on some exams in college courses. Each UExcel test has a scale that is set by a faculty committee and is different for each exam. The process, called standard setting, is described in more detail in the Technical Handbook. Excelsior puts each exam through a standard setting because different test questions have different levels of difficulty. To explain further, getting 70% of the questions right on the exam when the questions are easy does not show the same level of proficiency as getting 70% of questions correct when the questions are hard. Every form of a test (a form contains the test questions) has its own specific grading scale tailored to the particular questions on each exam form.

Please also note that on each form, some of the questions count toward the score and some do not; the grading scale applies only to those questions that count toward the score. The area with percentage ratings on the second page of your score report is intended to help identify relative strengths and weaknesses and which content areas to emphasize, should you decide to take the examination again. Your grade is based...
on both scored and pretest questions—pretest questions which are not scored. Therefore, the percentage ratings do not necessarily reflect the total percentage that counted toward your grade.

For the best view of the types of questions on this exam, see the sample questions in the back of this guide. Practice, practice, practice!

**Score Reporting**

For most of our examinations, based on performance, an examinee is awarded a letter grade of A, B, C, or F along with diagnostic information describing examinee performance in each of the major content areas in any given exam. A letter grade of D can be given, but credit is awarded for A, B, and C letter grades only. The letter grades reported to examinees indicate that their performance was equivalent to the performance of students who received the same letter grade in a comparable, on-campus course.

More specifically, the letter grade indicates the examinee’s proficiency relative to the learning outcomes specified in the exam content guide. Following are general descriptions of examinee performance at each level:

**Letter Grade Description**

- **A** Highly Competent: Examinee’s performance demonstrates an advanced level of knowledge and skill, relative to the learning outcomes.
- **B** Competent: Examinee’s performance demonstrates a good level of knowledge and skill, relative to the learning outcomes.
- **C** Marginally Competent: Examinee’s performance demonstrates a satisfactory level of knowledge and skill relative to the learning outcomes.
- **D** Not Competent (no credit recommended): Examinee’s performance demonstrates weak knowledge of the content and minimal skill relative to the learning outcomes.\(^1\)
- **F** Fail (no credit recommended): Examinee’s performance demonstrates no knowledge of the content and no skill in the subject relative to the learning outcomes.

Credit is transcripted by Excelsior College for examinees who achieve letter grades of C or higher.

We encourage colleges and universities to use the Excelsior College letter grades of A, B, and C as acceptable standards for awarding credit.

See page 22 for a sample UExcel Grade Report for Examinations, at the back of this content guide.

**UExcel Exam Resources**

**Excelsior College Bookstore**

The Excelsior College Bookstore offers recommended textbooks and other resources to help you prepare for UExcel exams.

The bookstore is available online at (login required): [www.excelsior.edu/bookstore](http://www.excelsior.edu/bookstore)

**Excelsior College Library**

Enrolled Excelsior College students can access millions of authoritative resources online through the Excelsior College Library. Created through our partnership with the Sheridan Libraries of The Johns Hopkins University, the library provides access to journal articles, books, websites, databases, reference services, and many other resources. Special library pages relate to the nursing degree exams and other selected exams. To access it, visit [www.excelsior.edu/library](http://www.excelsior.edu/library) (login is required).

Our library provides:

- 24/7 availability
- The world’s most current authoritative resources
- Help and support from staff librarians

**Online Tutoring**

Excelsior College offers online tutoring through SMARTTHINKING™ to connect with tutors who have been trained in a variety of academic subjects. To access SMARTTHINKING, go to [www.excelsior.edu/smarthinking](http://www.excelsior.edu/smarthinking). Once there, you may download a copy of the SMARTTHINKING Student Handbook as a PDF.

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1. In general, two hour exams do not award a D letter grade.
Preparing for UExcel Exams

Take Charge of Your Own Learning

At Excelsior College, independent, self-directed study supported by resources we help you find is not a new concept. We have always stressed to exam takers that they are acting as their own teacher, and that they should spend as much time studying for an exam as they would spend in a classroom and on homework for a corresponding college course in the same subject area.

Begin by studying the content outline contained in this content guide, at its most detailed level. You will see exactly which topics are covered, and where chapters on those topics can be found in the Recommended Resources. You will see exactly where you might need to augment your knowledge or change your approach.

The content outline, along with the Learning Outcomes for this exam and recommended textbooks, will serve as your primary resources.

How Long Will It Take Me to Study?

Study for a UExcel exam is comparable to an equivalent college-level course. As an independent learner, you should study and review as much as you would for the same subject in a campus-based college course. If you already have a background in the subject, you may be able to pass the exam successfully with fewer hours of study. It depends upon the learner as well as the subject, the number of credits (for example, a 6- or 8-credit exam will require more hours of study than a 3-credit exam), and the length of the exam. We strongly encourage you to create a long-term action, or study plan, so that you have a systematic approach to prepare for the exam. We’ve included guidelines for creating such a plan.

How Can I Create an Effective Long-Term Study Plan?

1. Determine the time you will require to complete your preparation for this exam. As a rule, you should plan to budget approximately 150 hours of study time for this exam. About 135 of those hours should be spent on studying the content alone. Aside from the content review, you should then factor in time to search for and use other resources, and to complete any projects and assignments in the study materials that will clarify your understanding of the topics in the content outline (that part in the content guide where the specific areas of study are spelled out). Spend more time on concepts and areas in which you feel you are weak. Totaled, this is approximately the amount of time you should expect to devote to a three-credit, campus-based course. The actual amount of time you require depends on many factors, and will be approximate. If your background is weak, you may need to set aside substantially more than 135–150 hours. If your background is strong, you may budget less time.

   Take a few minutes to review the content outline to assess your familiarity with the content. Then, in the space below, write the number of hours you will allocate to complete preparing for the exam.

   Hours Required =

2. Determine the time you will have available for study.

   In self-study, you need structure, as well as motivation and persistence, and a methodical approach to preparation. There is no set class to keep you on task. You have to do that yourself. Construct a time-use chart to record your daily activities over a one-week period. The most accurate way to do this is to complete the chart on a daily basis to record the actual amount of time you spend eating, sleeping, commuting, working, watching television, caring for others and yourself, reading, and everything else in an adult’s life. However, if your schedule is regular, you might prefer to complete the chart in one sitting and, perhaps, by consulting your appointment book or planner.

   After you have recorded your activities, you will be ready to schedule study periods around these activities or, perhaps, instead of some of them. In the space below, write the number of hours you will be able to set aside for study each week.

   Hours Required =

3. Divide the first number by the second number.

   This will give you the number of weeks you will need to set aside for independent study. For example, if you think you will require 170 hours of study and you have 10 hours available to study each week, divide 170 hours by 10 hours and you will get 17. This means that you will need about 17 weeks to complete this course of study. However, you will also need to allow...
about a week for review and self-testing. Moreover, to be on the safe side, you should also add two weeks to allow for unforeseen obstacles and times when you know you will not be able to study (e.g., during family illnesses or holidays). So, in this case, you should allot a total of 18 to 19 weeks to complete your study.

4. Schedule your examination to coincide with the end of your study period.

For example, if you plan to allow 18 weeks for study, identify a suitable examination date and begin study at least 18 weeks before that date. (The date you begin study assumes that you will have received all of your study materials, particularly textbooks, by that time.)

5. Format a long-term study plan.

You will need to use a calendar, planner, or some other tool to format and track your long-term study plan. Choose a method that is convenient and one that keeps you aware of your study habits on a daily basis. Identify the days and exact hours of each day that you will reserve for study throughout your whole independent study period. Check to see that the total number of hours you designate for study on your long-term study plan adds up to the number of hours you have determined you will need to complete this course of study (Step 1).

6. Record in your long-term study plan the content you plan to cover during each study period.

Enter the session numbers, review, and examination preparation activities you will complete during each study period. While it is suggested that approximately 160–170 hours of study is required for this exam, each and every student may require different timelines based on their comfort with, and comprehension of, the material.

You now have a tentative personal long-term study plan. Keep in mind that you will have to adjust your study plan, perhaps several times, as you study. It is only by actually beginning to work systematically through the material, using the content outline, that you will be able to determine accurately how long you should allow for each unit.

What Learning Strategy Should I Use?

The following guidelines are intended to help you acquire the grounding in the knowledge and skills required for successful completion of this examination.

1. Approach learning with a positive attitude.

Most students are capable of learning subject content if they devote enough time and effort to the task. This devotion will give you a positive edge and a feeling of control.

2. Diligently complete the exact work you specified in your study plan.

Your study plan is being designed for the specific purpose of helping you achieve the learning outcomes for this exam.

3. Be an active learner.

You should actively engage in the learning process. Read critically, take notes, and continuously monitor your comprehension. Keep a written record of your progress, highlight content you find difficult to grasp, and seek assistance from someone in your learning community who can help you if you have difficulty understanding a concept.

4. Be patient: you may not understand everything immediately.

When encountering difficulty with new material, be patient with yourself and don’t give up. Understanding will come with time and further study. Sometimes you may need to take a break and come back to difficult material. This is especially true for any primary source material (original letters, documents, and so forth) that you may be asked to read. The content outline will guide you through the material and help you focus on key points. You will find that many concepts introduced in earlier sessions will be explained in more detail in later sessions.

5. Apply your learning to your daily life.

Use insights you gain from your study to better understand the world in which you live. Apply the learning whenever you can. Look for instances that support or contradict your reading on the subject.
6. Accommodate your preferred way of learning.

How do you learn best? Common ways to learn are reading, taking notes and making diagrams, and by listening to someone (on video or live). Others learn by doing. Do any of these descriptions apply to you? Or does your learning style vary with the learning situation? Decide what works for you and try to create a learning environment to accommodate your preferences.

Study Tips

Become an active user of the resource materials. Aim for understanding rather than memorization. The more active you are when you study, the more likely you will be to retain, understand, and apply the information.

The following techniques are generally considered to be active learning:

- **preview or survey** each chapter
- **highlight or underline text** you believe is important
- **write questions or comments** in the margins
- **practice re-stating content** in your own words
- **relate what you are reading** to the chapter title, section headings, and other organizing elements of the textbook
- **find ways to engage** your eyes, your ears, and your muscles, as well as your brain, in your studies
- **study with a partner or a small group** (if you are an enrolled student, search for partners on MyExcelsior Community)
- **prepare your review notes** as flashcards or create recordings that you can use while commuting or exercising

When you feel confident that you understand a content area, review what you have learned. Take a second look at the material to evaluate your understanding. If you have a study partner, the two of you can review by explaining the content to each other or writing test questions for each other to answer. Review questions from textbook chapters may be helpful for partner or individual study, as well.

Study smart for your UExcel exam, and succeed with our [Student Success Guide](#).

Using UExcel Practice Exams

The Science of Nutrition exam has a corresponding practice exam, which is delivered in the Canvas learning platform. The official UExcel practice exams are highly recommended as part of your study plan. They can be taken using any computer with a supported Web browser such as Google Chrome.

A practice exam package containing two forms is available for this exam, for $75. To register for the practice exam, visit [www.excelsior.edu](http://www.excelsior.edu) and log into your MyExcelsior account. Please note: You must be registered for the corresponding credit-bearing exam first, before you can register for the practice exam.

Practice exams are not graded. Rather, they are intended to help you make sure you understand the subject and give you a sense of what the questions will be like on the exam for credit. Ideally, you would check any questions you got wrong, look at the explanations, and go back to the textbook to reinforce your understanding. After taking both forms of the practice exam, you should feel confident in your answers and confident that you know the material listed in the content outline.

Practice exams are one of the most popular study resources. Practice exams are typically shorter than the credit-bearing exam. Since the questions are drawn from the same pool of questions that appear on the credit-bearing exam, what you will see when you sit for the graded exam will be roughly the same. Used as intended, these practice exams will enable you to:

- Review the types of questions you may encounter on the actual exam.
- Practice testing on a computer in a timed environment.
- Practice whenever and wherever it is convenient for you.
- Take two different forms of a practice exam within a 180-day period. (We highly recommend that you take the first form of the practice exam as a pretest, early in the study period. Use the results to identify areas to further study and carry out a plan. Then take the second form as a post-test and see how much you have improved.)

Although there is no guarantee, our research suggests that exam takers who do well on the practice exams are more likely to pass the actual exam than those who do not, or who do not take advantage of the opportunity. Note that since the practice exams are
not graded (calibrated) the same way as the scores on the credit-bearing exam, it will be hard for you to use the practice exams as a way to predict your score on the credit-bearing exam. The main purpose of the practice exams is for you to check your knowledge and to become comfortable with the types of questions you are likely to see in the actual, credit-bearing exam.

About Test Preparation Services
Preparation for UExcel® exams and Excelsior College® Examinations, though based on independent study, is supported by Excelsior College with a comprehensive set of exam learning resources and services designed to help you succeed. These learning resources are prepared by Excelsior College so you can be assured that they are current and cover the content you are expected to master for the exams. These resources, and your desire to learn, are usually all that you will need to succeed.

There are test-preparation companies that will offer to help you study for our examinations. Some may imply a relationship with Excelsior College and/or make claims that their products and services are all that you need to prepare for our examinations.

Excelsior College is not affiliated with any test preparation firm and does not endorse the products or services of these companies. No test preparation vendor is authorized to provide admissions counseling or academic advising services, or to collect any payments, on behalf of Excelsior College. Excelsior College does not send authorized representatives to a student’s home nor does it review the materials provided by test preparation companies for content or compatibility with Excelsior College examinations.

To help you become a well-informed consumer, we suggest that before you make any purchase decision regarding study materials provided by organizations other than Excelsior College, you consider the points outlined on our website at www.excelsior.edu/testprep.

Exam Preparation Strategies
Each learner is different. However, all learners should read the content outline in the exam’s Content Guide and ensure that they have mastered the concepts. For someone with no prior knowledge of the subject, a rule of thumb is 135 hours of study for a three-credit exam—this number is just to give you an idea of the level of effort you will need, more or less.

Content Guides
This content guide is the most important resource. It lists the outcomes, a detailed content outline of what is covered, and textbooks and other study resources. It also has sample questions and suggestions for how to study. Content guides are updated periodically to correspond with changes in particular examinations and in textbook editions. Test-takers can download any of the latest free UExcel content guides by visiting the individual exam page or from the list at www.excelsior.edu/contentguides.

Prior Knowledge
A familiarity with precalculus topics including algebra, trigonometry, and functions is assumed.

Using the Content Outline
Each content area in the content outline includes the most important sections of the recommended resources for that area. These annotations are not intended to be comprehensive. You may need to refer to other chapters in the recommended textbooks. Chapter numbers and titles may differ among textbook editions.

This content outline contains examples of the types of information you should study. Although these examples are numerous, do not assume that everything on the exam will come from these examples. Conversely, do not expect that every detail you study will appear on the exam. Any exam is only a broad sample of all the questions that could be asked about the subject matter.

Using the Sample Questions and Rationales
Each content guide provides sample questions to illustrate those typically found on the exam. These questions are intended to give you an idea of the level of knowledge expected and the way questions are typically phrased. The sample questions do not sample the entire content of the exam and are not intended to serve as an entire practice test.
Recommended Resources for the UExcel Exam in Science of Nutrition

The resources listed below are recommended by the examination development committee for use preparing for this exam. Resources listed under “Exam Verification Resources” were used to verify all the questions on the exam. Please refer to the Content Outline to see which parts of the exam are covered by which of the Exam Verification Resources. Resources listed under “Supplemental Resources” provide additional material that may deepen or broaden your understanding of the subject, or that may provide an additional perspective. Textbook resources, both Exam Verification and Supplemental, are available for purchase at the Excelsior College Bookstore.

You should allow ample time to obtain resources and to study sufficiently before taking the exam, so plan appropriately and with care.

A word about textbook editions: Textbook editions listed in the UExcel content guides may not be the same as those listed in the bookstore. Textbook editions may not exactly match up in terms of table of contents and organization, depending upon the edition. However, our team of exam developers checks exam content against every new textbook edition to verify that all subject areas tested in the exam are still adequately available in the study materials. If needed, exam developers will list supplemental resources to ensure that all topics in the exam are still sufficiently covered. Public libraries may have the textbooks you need, or may be able to obtain them for you through interlibrary loan to reduce textbook costs. You may also consider financial aid, if you qualify, to further help defray the steep cost of textbooks. A section on OER has been included in this guide to help you locate additional resources to augment your study.

Exam Verification Resources

Supplemental Resources
There are no Supplemental Resources for the Science of Nutrition exam. For additional information, please refer to available open educational resources (OER).

Reducing Textbook Costs
Many students know it is less expensive to buy a used textbook, and buying a previous edition is also an option. The Excelsior College bookstore includes a buyback feature and a used book marketplace, as well as the ability to rent digital versions of textbooks for as long as students need them. Students are encouraged to explore these and the many other opportunities available online to help defray textbook costs.

A Word About Open Educational Resources
Open educational resources (OER) are educational materials available for study at no cost on the Web. Some OER are available for anyone to access any time. Others, such as Massive Open Online Courses (MOOCs), require sign-up and are only available during certain windows. Please note that some MOOC providers offer certificates of completion or other products or services for a fee. No MOOC or other OER is a complete substitute for the content guide and officially Recommended Resources listed here in this content guide. However, by definition, MOOCs are essentially free of charge and include access to a main body of learning materials that may help you in your learning.

Being an independent learner preparing for credit by exam, you may not need any of the fee-based options that are offered elsewhere online. But if you are looking for a coherent academic course for self-study, lectures on specific topics, or audio or visual materials that fit your learning style better than print materials alone, a MOOC or other type of OER may be your answer. Keep in mind that none of these OER were designed by Excelsior, nor are they guaranteed to match the exam content outlines completely. They are simply another tool available in your study kit.

We highly encourage using the Recommended Resources. In the content outline, you will see that the topics in the exam are referenced to specific portions of recommended textbooks. Using OER alone will not ensure you’ve completely covered the
content in the exam, or it may not cover some topics in sufficient-enough depth without the use of the formal, recommended textbooks.

If the OER course you choose does not include a textbook for reference and you do not have significant practical theory-based experience in the field of study, use a college textbook to ensure adequate preparation for the exam, and use the exam’s content outline as a guide.

Combined with comparable college textbooks, OER provides you with a variety of choices in knowledge sources and learning experiences, to enhance your understanding of the subject matter.

**Choosing Open Educational Resources**

Most sites for university-based OER can be searched through [www.ocwconsortium.org](http://www.ocwconsortium.org) and/or [www.oercommons.org](http://www.oercommons.org).

Sites that specialize in Web courses designed by college professors under contract with the website sponsor, rather than in Web versions of existing college courses, include:

- [www.education-portal.com](http://www.education-portal.com)
- [www.opencourselibrary.org](http://www.opencourselibrary.org) (abbreviated as OCL)

We have included specific courses that cover material for one or more UExcel® exams from the sites in the listings above. It’s worth checking these sites frequently to see if new courses have been added that may be more appropriate or may cover an exam topic not currently listed.

In addition, sites like Khan Academy ([www.khanacademy.com](http://www.khanacademy.com)) and iTunes U feature relatively brief lessons on very specific topics rather than full courses. Full courses are also available on iTunes U ([http://www.apple.com/education/ipad/itunes-u/](http://www.apple.com/education/ipad/itunes-u/)). We have chosen a few courses and collections for this listing.

**Other Online Resources**

This section of the OER Guide is provided to allow learners to independently search for resources. Send an e-mail to [OER@excelsior.edu](mailto:OER@excelsior.edu) if you have questions about a resource’s credibility.

**Open Online Textbooks**

- BookBoon

**Flatworld Knowledge**

- [http://catalog.flatworldknowledge.com/#our-catalog](http://catalog.flatworldknowledge.com/#our-catalog)

**College Readiness**

- Khan Academy
  - [http://www.khanacademy.org](http://www.khanacademy.org)

- Hippocampus
  - [http://www.hippocampus.org](http://www.hippocampus.org)

- Open Course Library

**Study Aids**

- Education Portal

- Khan Academy
  - [http://www.khanacademy.org](http://www.khanacademy.org)

- Annenberg Learner
  - [http://www.learner.org](http://www.learner.org)

- OpenCourseWare

- OER Commons
  - [http://www.oercommons.org](http://www.oercommons.org)

- Open Course Library
  - [http://www.opencourselibrary.org](http://www.opencourselibrary.org)

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To achieve academic success, rate yourself at Excelsior College’s Self-Regulated Learning Lab. Visit the Diagnostic Assessment & Achievement of College Skills site at [https://srl.daacs.net/](https://srl.daacs.net/)

It’s free!
Content Outline

**General Description of the Examination**

The UExcel Science of Nutrition examination is based on material typically taught in a one-semester lower-level course in nutrition science.

This examination measures knowledge of facts and terminology, an understanding of concepts central to the topics of macronutrients, water and micronutrients, cell biology and physiology of nutrient utilization, and energy balance, and the ability to apply these concepts.

Those beginning to study for this exam should be familiar with concepts generally covered in human physiology, biology, and chemistry.

**Learning Outcomes**

After you have successfully worked your way through the recommended study materials, you should be able to demonstrate the following learning outcomes:

1. Examine the guidelines and principles for planning a healthy diet. (Aligns to GECC 2.1)
2. Define the functions of the macronutrients and micronutrients. (Aligns to GECC 2.1)
3. Examine the physiological effects of deficiency and toxicity of dietary nutrients. (Aligns to GECC 2.1)
4. Summarize the processes of nutrient digestion, absorption, transport, and utilization. (Aligns to GECC 2.1)
5. Demonstrate an understanding of how energy balance contributes to both obesity and physical fitness. (Aligns to GECC 2.1)
6. Recognize the major organ systems, tissues, cells, and intracellular organelles involved in nutrient utilization. (Aligns to GECC 2.1)

**General Education Career Competencies addressed in this exam**

GECC-2: Mathematical and Scientific Problem Solving: Apply scientific knowledge and reasoning to make evidence-based decisions.
Content Outline

The content outline describes the various areas of the test, similar to the way a syllabus outlines a course. To fully prepare requires self-direction and discipline. Study involves careful reading, reflection, and systematic review.

The major content areas on the Science of Nutrition examination, the percent of the examination, and the hours to devote to each content area are listed below.

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Percent of the Examination</th>
<th>Hours of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Overview of Nutrition</td>
<td>15%</td>
<td>20</td>
</tr>
<tr>
<td>II. Macronutrients</td>
<td>25%</td>
<td>27</td>
</tr>
<tr>
<td>III. Water and Micronutrients</td>
<td>25%</td>
<td>27</td>
</tr>
<tr>
<td>IV. Physiology of Nutrient Utilization</td>
<td>15%</td>
<td>21</td>
</tr>
<tr>
<td>V. Consequences of Energy Balance</td>
<td>20%</td>
<td>27</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Approximate: For those test-takers who know the topic well, less time may be needed to learn the subject matter. For those who are new to the subject matter, more time may be required for study.

NOTE: Occasionally, examples will be listed for a content topic to help clarify that topic. However, the content of the examination is not limited to the specific examples given.

I. Overview of Nutrition

15 PERCENT OF EXAM

Ch. 1, An Overview of Nutrition
Ch. 2, Planning a Healthy Diet

A. Introduction
   1. Classification of nutrients
      a. Essential nutrients
      b. Energy yielding nutrients
      c. Organic vs. inorganic nutrients

2. Science of nutrition
   a. Scientific method
      1) Development of hypotheses
      2) Research design
   b. Types of research studies
      1) Epidemiological
      2) Experimental

3. Dietary reference intakes (DRIs)

4. Nutrition assessment, diet, and health
   a. Adequate nutrition
   b. Malnutrition
   c. Chronic diseases

5. Reliable nutrition information

B. Planning a healthy diet
   1. Principles and guidelines
      a. Dietary guidelines for Americans
      b. Nutrient and energy density
2. Diet planning guides
   a. MyPlate
   b. Nutrients of concern
3. Food labels
   a. Ingredient list
   b. Nutrition facts panel
   c. Claims on labels
4. Vegetarian diets

II. Macronutrients

25 PERCENT OF EXAM

Ch. 4, The Carbohydrates: Sugars, Starches, and Fibers
Ch. 5, The Lipids: Triglycerides, Phospholipids, and Sterols
Ch. 6, Protein: Amino Acids

A. Carbohydrates
   1. Types of carbohydrates
      a. Simple (mono- and disaccharides)
      b. Complex
      c. Fiber
         1) Soluble
         2) Insoluble
   2. Food sources and recommended intakes
   3. Glucose homeostasis
      a. Type 1 diabetes
      b. Type 2 diabetes
   4. Health effects associated with carbohydrates
      a. Obesity
      b. Gastrointestinal health
      c. Dental caries
      d. Lactose intolerance
      e. Alternative sweeteners

B. Lipids
   1. Types of lipids
      a. Triglycerides
         1) Glycerol
         2) Fatty acids
            a) Saturated
            b) Unsaturated
               i. Monounsaturated
               ii. Polyunsaturated
                  a) Essential fatty acids
      b. Phospholipids
      c. Sterols
         1) Cholesterol
         2) Phytosterols (plant sterols)
   2. Food sources and recommended intakes of lipids
      a. Health effects associated with lipids
      b. Cardiovascular disease
         1) Hydrogenation and trans fatty acids
      c. Obesity
      d. Cancer

C. Proteins
   1. Amino acids
      a. Nonessential
      b. Essential
   2. Protein turnover
      a. Amino acid pool
      b. Nitrogen balance
   3. Functions of proteins
   4. Food sources and recommended intakes
      a. Protein quality
      b. Complete proteins
      c. Incomplete and complementary proteins
   5. Health effects associated with proteins
      a. Protein energy malnutrition
b. Protein and amino acid supplementation

6. Animal vs. plant sources

III. Water and Micronutrients

25 PERCENT OF EXAM

Ch. 10, The Water-Soluble Vitamins: B Vitamins and Vitamin C
Ch. 11, The Fat-Soluble Vitamins: A, D, E, and K
Ch. 12, Water and the Major Minerals
Ch. 13, The Trace Minerals

A. Water
1. Properties and importance of water
2. Functions of water in the body
3. Water balance and recommended intake
4. Dehydration

B. Minerals: the inorganic nutrients
1. Dietary requirements, food sources, functions in the body, effects of deficiency and toxicity of minerals
   a. Major minerals
      1) Electrolytes
         a) Sodium
         b) Potassium
         c) Chloride
      2) Other major minerals
         a) Calcium
         b) Phosphorus
         c) Magnesium
         d) Sulfur
   b. Trace minerals
      1) Iron
      2) Zinc
      3) Iodine
      4) Selenium
      5) Copper
      6) Manganese
   c. Common health effects associated with minerals
      1) Hypertension
      2) Osteoporosis
      3) Iron deficiency anemia and hemochromatosis
      4) Iodine deficiency
      5) Fluoride and dental caries
      6) Hyponatremia

C. Vitamins
1. Dietary requirements, food sources, functions in the body, effects of deficiency and toxicity of vitamins
2. Water-soluble vitamins
   a. B vitamins
      1) Thiamine
      2) Riboflavin
      3) Niacin
      4) Biotin
      5) Pantothenic acid
      6) Vitamin B6
      7) Folate
      8) Vitamin B12
   b. Vitamin C
3. Fat-soluble vitamins
   a. Vitamin A
   b. Vitamin D
   c. Vitamin E
   d. Vitamin K
4. Health effects
   a. B-vitamin fortification
   b. Neural tube defects
   c. Pernicious anemia
   d. Vitamin D supplements

D. Antioxidant nutrients and health
E. Vitamin and mineral supplements
IV. Cell Biology and Physiology of Nutrient Utilization

15 PERCENT OF EXAM

Ch. 3, Digestion, Absorption, and Transport
Ch. 7, Energy Metabolism

A. Digestion
1. Anatomy of the GI tract
2. Muscular action
3. Digestive secretions
4. Nutrient digestion
   a. Carbohydrates
   b. Lipids
   c. Protein
   d. Fiber

B. Absorption
1. Mechanisms of absorption
2. To the bloodstream
   a. Amino acids, di- and tripeptides
   b. Simple carbohydrates
   c. Short and medium chain fatty acids, glycerol
   d. Water-soluble vitamins
   e. Minerals
   f. Water
3. To the lymphatic system
   a. Monoglycerides
   b. Long chain fatty acids
   c. Fat-soluble vitamins
   d. Cholesterol and phospholipids

C. Health and regulation of the GI tract
1. Bacteria
2. Hormones
3. Nerve pathways
4. Health and digestive problems
   a. Diarrhea
   b. Irritable bowel syndrome
   c. Constipation
   d. GERD
   e. Other problems

D. Transport
1. Vascular system
2. Lymphatic system
3. Lipid transport
   a. Lipoproteins

E. Cell anatomy and metabolism
1. Catabolic pathways
   a. Glycolysis
   b. TCA cycle
   c. Electron transport chain
   d. Beta-oxidation
   e. Feasting and fasting
2. Anabolic pathways
   a. Protein synthesis
   b. Gluconeogenesis
   c. Glycogen synthesis
   d. Lipogenesis
3. Alcohol metabolism

F. Excretion
1. Kidneys
2. Bile
3. Intestines
4. Skin
V. Consequences of Energy Balance

20 PERCENT OF EXAM

Ch. 8, Energy Balance and Body Composition
Ch. 9, Weight Management: Overweight, Obesity, and Underweight
Ch. 14, Fitness: Physical Activity, Nutrients, and Body Adaptations

A. Energy balance
   1. Influences on energy intake
   2. Components of energy expenditure

B. Body composition
   1. Measurements
      a. BMI
      b. DEXA
      c. Other measures
   2. Fat distribution
      a. Waist circumference

C. Weight management and health implications of over- and underweight
   1. Overweight and obesity
      a. Prevalence
         1) Childhood obesity
      b. Physiology of adipose tissue
      c. Causes of overweight and obesity
         1) Genetics
         2) Environment
      d. Treatments for overweight and obesity
         1) Dietary factors
            a) Eating plans
               (i) Fad diets
            2) Behavior modification
            3) Physical activity
            4) Aggressive treatments
               a) Surgery
               b) Drugs
      2. Underweight
         a. Physiological implications
         b. Treatments
         c. Eating disorders
            1) Anorexia
            2) Bulimia
            3) Binge eating
            4) Female athlete triad
            5) Other disorders

D. Physical fitness
   1. Definition of physical fitness
   2. Benefits of fitness
   3. Types of fitness
   4. Energy systems to support activity
      a. Anaerobic
         1) ATP-CP
         2) Glycolysis
      b. Aerobic
         1) Glycogen utilization
         2) Fat utilization
   5. Nutrients to support activity
      a. Vitamins
      b. Minerals
      c. Fluids and electrolytes
         1) Sports drinks
      d. Dietary patterns
         1) Diets to support activity
         2) Before, during, and after competition foods/meals
      e. Supplements and ergogenic aids
Sample Questions

1. Which are consistently reliable sources of nutrition-related information?
   (Select the 2 that apply.)
   1) an unsolicited e-mail
   2) a registered dietician
   3) a famous athlete
   4) the PubMed website
   5) a website selling a product

2. Which of the following is considered an “empty kCal” food?
   1) pizza
   2) bacon
   3) soda
   4) hamburger

3. Which descriptions are accurate about the MyPlate tool?
   (Select the 3 that apply.)
   1) Its recommendations apply only to adults.
   2) The sections of the plate vary in size to show the relative proportion of each food group.
   3) It lists the healthiest choices within each food group.
   4) It reflects five food groups.
   5) It was created by the United States Department of Agriculture.

4. What was the basis for the Food and Drug Administration’s (FDA’s) granting stevia the status of “generally recognized as safe”?
   1) Stevia was used for many years by the indigenous people of South America to sweeten their beverages.
   2) Stevia has an Acceptable Daily Intake (ADI) of 4 mg/kg body weight.
   3) Stevia is a glycoside digested and absorbed normally.
   4) Stevia is 300 times as sweet as pure sucrose.

5. How would consumption of plant sterols affect total blood cholesterol concentration?
   Total blood cholesterol concentration would
   1) remain the same.
   2) decrease.
   3) increase slightly.
   4) increase dramatically.
6. Which hormone is a protein?
   1) testosterone  
   2) estrogen  
   3) cortisol  
   4) insulin

7. For which condition is oral rehydration therapy necessary?
   1) overproduction of aldosterone by adrenal glands  
   2) dehydration due to diarrhea  
   3) protein loss from injury  
   4) glucose loss in diabetes

8. Which is rich in molybdenum?
   1) cereals  
   2) butter  
   3) oils  
   4) poultry

9. Which B vitamin is most likely to be destroyed by food processing?
   1) pantothenic acid  
   2) niacin  
   3) biotin  
   4) riboflavin

10. Which segment of the gastrointestinal tract has three muscle layers?
    1) stomach  
    2) esophagus  
    3) small intestine  
    4) large intestine

11. Why is high-density lipoprotein (HDL) is called the “good” cholesterol?
    1) HDL cholesterol is metabolized by the muscle.  
    2) HDL inhibits the transport of dietary lipids by chylomicrons.  
    3) HDL interacts with VLDL, causing less fat to be deposited in the fat cell.  
    4) HDL picks up cholesterol from the body’s cells and facilitates its disposal by the liver.

12. Which substance can be used to make glucose?
    1) lactate  
    2) fatty acids  
    3) acetyl CoA  
    4) ketogenic amino acids

13. Which is likely to be the most successful weight-loss strategy?
    1) taking ephedrine-containing supplements that help with weight loss (about 2 pounds a month)  
    2) combining of steam, sauna bath, and wraps to burn and break up fat  
    3) losing 10 percent of weight within 6 months to one year  
    4) taking FDA-approved drugs for weight loss

14. During high-intensity exercise, a person depletes which fuel source most significantly?
    1) glycogen  
    2) fat  
    3) protein  
    4) lactate

15. Which is least beneficial for replacing fluids for serious endurance athletes during athletic events?
    1) enhanced water  
    2) energy drink  
    3) sports drink  
    4) plain water
Rationales

1. (IA5)
   1. There is no way to know if this information is reliable or not.
   *2. RDs have college degrees in nutrition and/or dietetics, and are thus qualified to give sound nutritional advice.
   3. Unless the individual has formal, college-level training in nutrition, there is no way for you to know if what they say is factual and based upon valid scientific evidence.
   *4. This is a federal government-sponsored website that contains links to peer-reviewed scientific studies. It is thus a trustworthy source of valid nutrition-related information.
   5) When money is involved, one should always be cautious and wary.

2. (IB1b)
   1. Even pizza contains some nutrients (protein, fats, carbohydrates).
   2. Even bacon contains some nutrients (protein, fat).
   *3. Soda is considered an empty calorie food because none of its calories provide any nutrients.
   4. Even a hamburger contains some nutrients (protein, fat).

3. (IB2a)
   1. The MyPlate recommendations apply to children as well as adults.
   *2. Each part of MyPlate is sized differently to reflect the relative proportion each food group contributes to a healthy diet. For example, the vegetable section is slightly larger than the protein section.
   3. MyPlate does not distinguish between the foods that are high or low in nutrient density.
   *4. The four food groups are fruits, grains, vegetables, and protein. A circle to the right represents dairy.
   *5) MyPlate was created by the USDA and is found on the website www.choosemyplate.gov.

4. (IIA4e)
   *1. The fact that stevia has been used for many years without side effects by people in South America was a major reason for granting GRAS status.
   2. The ADI for stevia is not a basis for granting GRAS status.
   3. The fact that stevia is digested and absorbed normally is not a basis for GRAS status.
   4. The sweetness of stevia is not a basis for granting GRAS status.

*correct answer
5. (IIB2)
1. Plant sterols can significantly decrease blood cholesterol concentration, so it would not remain the same.
*2. Consumption of plant sterols would decrease total blood cholesterol concentration.
3. Plant sterols do not cause blood cholesterol concentration to increase.
4. See 3).

6. (IIC3)
1. Testosterone is made from the lipid cholesterol and is not a protein.
2. Estrogen is made from the lipid cholesterol and is not a protein.
3. Cortisol is a steroid hormone and is not a protein.
*4. Insulin is a small protein made by the pancreas.

7. (IIIA3)
1. Medical intervention is necessary because this condition occurs when there is a kidney tumor. Mere oral rehydration therapy is insufficient.
*2. Oral rehydration therapy is used worldwide to replace fluid lost due to dehydration. It consists of a solution of sugar, salt, and water and is taken by mouth.
3. Oral rehydration therapy does not treat protein loss from injury.
4. Medical intervention is necessary because this occurs when diabetes is uncontrolled. Mere oral rehydration therapy is insufficient.

8. (IIIB1b9)
*1. Molybdenum-rich foods include legumes, breads, other grain products, leafy green vegetables, milk, and liver.
2. See 1).
3. See 1).
4. See 1).

9. (IIIC2a5)
*1. Pantothenic acid is easily destroyed in food processing.
2. Niacin is relatively stable during food processing.
3. Biotin is relatively stable during food processing.
4. Riboflavin is easily destroyed by light, but is relatively stable during food processing.

10. (IVA2)
*1. The stomach has circular, longitudinal, and diagonal muscle layers.
2. The esophagus has circular and longitudinal muscle layers.
3. The small intestine has circular and longitudinal muscle layers.
4. The large intestine has circular and longitudinal muscle layers.

11. (IVD3)
1. HDL cholesterol is not metabolized by the muscle.
2. Inhibition of chylomicron transport of dietary lipids is not a function of HDL.
3. HDL interaction with VLDL does not result in less fat deposition in tissues.
*4. HDL cholesterol is known as “good cholesterol” because it encourages cardiovascular health by participating in reverse cholesterol transport.

12. (IVE2b)
*1. Lactate can be converted to pyruvate, which can be used to make glucose.
2. Fatty acids are oxidized to acetyl CoA which cannot be used to make glucose.
3. Acetyl CoA cannot be used to make glucose.
4. Ketogenic amino acids can be converted to acetyl CoA, which cannot be used to make glucose.

*correct answer
13. (VC1d)
1. This weight loss comes with great risk. These supplements have been implicated in numerous heart attacks and seizures.
2. These gimmicks don’t help with weight loss. They do not melt the fat off the body, although they may dehydrate people so they lose water weight.
*3. Successful weight-loss strategies embrace small changes, moderate losses, and reasonable goals. Losing 10 percent of weight within 6 months to one year is the most reasonable strategy.
4. When these drugs are used as part of a long-term comprehensive weight loss program, they can help with modest weight loss; nevertheless, the long-term use of drugs poses risks.

14. (VD4b1)
*1. For most people, glycogen stores will be depleted by two hours of intensive activity unless the activity intensity is reduced to allow for more aerobic metabolism.
2. See 1).
3. See 1).
4. See 1).

15. (VD5c1)
1. Enhanced water contains few carbohydrates and electrolytes, but flavors may encourage greater fluid intake.
*2. Energy drinks can hinder performance and contain high concentrations of carbohydrates that are not optimal for fluid absorption.
3. Sports drinks deliver fluids as well as carbohydrates and electrolytes in specific concentrations necessary to replenish fluids and nutrients lost during endurance activities.
4. Plain water delivers fluids without any potential harmful additions. While it may not be sufficient alone for an endurance athlete, it is unlikely to cause harm or hinder performance.
Taking the Exam

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• allow sufficient time to travel, park, and locate the test center
• be prepared for possible variations in temperature at the test center due to weather changes or energy conservation measures
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**DETAILED SCORE REPORT**

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